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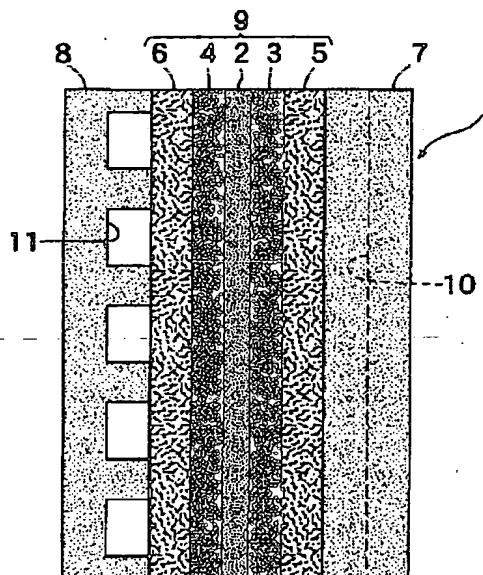
(54) **ELECTROLYTE FILM AND ELECTRODE ASSEMBLY FOR SOLID HIGH POLYMER MOLECULE FUEL CELL**

(57) Abstract:

PROBLEM TO BE SOLVED: To enable recycling electrolyte films.

SOLUTION: The electrolyte film and electrode assembly 9 of the solid high polymer molecule type fuel cell is equipped with an electrolyte film 2, and an air electrode 3 and a fuel electrode 4 which sandwich the electrolyte film 2. The electrolyte film 2, the air electrode 3, and the fuel electrode 4 have a high polymer molecule ion exchange component, respectively. The high polymer molecule ion exchange component is an aromatic hydrocarbon system high polymer molecule ion exchange component not having fluorine and solvable in a solvent.

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<div data-bbox="129 1774 186 1984">JAPANESE</div> <div data-bbox="146 1512 186 1764">[JP,2002-025581,A]</div> <div data-bbox="251 1060 373 1984">CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS</div>	<div data-bbox="446 1795 479 1984">* NOTICES *</div> <div data-bbox="519 1281 592 1984">Japan Patent Office is not responsible for any damages caused by the use of this translation.</div> <div data-bbox="625 955 779 1984">1. This document has been translated by computer. So the translation may not reflect the original precisely. 2. **** shows the word which can not be translated. 3. In the drawings, any words are not translated.</div> <div data-bbox="836 1858 876 1984">CLAIMS</div> <div data-bbox="901 1848 950 1984">[Claim(s)]</div> <div data-bbox="950 955 1274 1984">[Claim 1] It has the air pole (3) and fuel electrode (4) which sandwich an electrolyte film (2) and its electrolyte film (2). These electrolytes film (2), In the electrolyte film-electrode collection object of a solid-state macromolecule type fuel cell with which an air pole (3) and a fuel electrode (4) have a macromolecule ion-exchange component, respectively the aforementioned macromolecule ion-exchange component The electrolyte film-electrode collection object of the solid-state macromolecule type fuel cell which is a non-fluorine and is characterized by being an aromatic-hydrocarbon system macromolecule ion-exchange component meltable to a solvent.</div> <div data-bbox="1274 1008 1356 1984">[Claim 2] The aforementioned electrolyte film (2) the 1st aromatic-hydrocarbon system macromolecule ion-exchange component It has. Moreover, the</div>
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Drawing selection	[Representative drawing]
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CLAIMS

[Claim(s)]

[Claim 1] It has the air pole (3) and fuel electrode (4) which sandwich an electrolyte film (2) and its electrolyte film (2). These electrolytes film (2), In the electrolyte film-electrode collection object of a solid-state macromolecule type fuel cell with which an air pole (3) and a fuel electrode (4) have a macromolecule ion-exchange component, respectively the aforementioned macromolecule ion-exchange component The electrolyte film-electrode collection object of the solid-state macromolecule type fuel cell which is a non-fluorine and is characterized by being an aromatic-hydrocarbon system macromolecule ion-exchange component meltable to a solvent.

[Claim 2] The aforementioned electrolyte film (2) the 1st aromatic-hydrocarbon system macromolecule ion-exchange component It has. Moreover, the aforementioned air pole (3) And a fuel electrode The direction of the aromatic-hydrocarbon system macromolecule ion-exchange component of the above 2nd of solubility [as opposed to / (4) has the 2nd aromatic-hydrocarbon system macromolecule ion-exchange component, respectively, and / the aforementioned solvent] is size from the aromatic-hydrocarbon system macromolecule ion-exchange component of the above 1st. The electrolyte film-electrode collection object of a solid-state macromolecule type fuel cell according to claim 1.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention is equipped with the electrolyte film-electrode collection object, the air pole which sandwiches an electrolyte film and its electrolyte film especially, and fuel electrode of a solid-state macromolecule type fuel cell, and these electrolytes film, an air pole, and a fuel electrode are related with the electrolyte film-electrode collection object of the solid-state macromolecule type fuel cell which has a macromolecule ion-exchange component, respectively.

[0002]

[Description of the Prior Art] Conventionally, the fluororesin system ion exchanger is used as a macromolecule ion-exchange component in this kind of collection object.

[0003]

[Problem(s) to be Solved by the Invention] the recovery reuse since the aforementioned fluororesin system ion exchanger is generally insoluble to a solvent -- as a matter of fact --

impossible -- this point -- it was uneconomical

[0004] Moreover, in an air pole and a fuel electrode, although the air pole and the fuel electrode, and the electrolyte film were burning the aforementioned collection object since it was generally unified by the hotpress when collecting the things which made the catalyst particle contained in them, for example, a carbon black particle, support two or more Pt (platinum) particles, there was also a problem that the recovery by this thing [burning] had bad workability.

[0005]

[Means for Solving the Problem] this invention aims at offering the aforementioned collection object which enabled it to collect easily the catalyst particles which enable recovery reuse of an electrolyte film and are contained in an air pole and fuel by using a specific thing as a macromolecule ion-exchange component.

[0006] In order to attain the aforementioned purpose In the electrolyte film-electrode collection-object-of-a-solid-state-macromolecule-type-fuel-cell-with-which-according-to-this invention it has an electrolyte film, and the air pole and fuel electrode which sandwich the electrolyte film, and these electrolytes film, an air pole, and a fuel electrode have a macromolecule ion-exchange component, respectively The electrolyte film-electrode collection object of the solid-state macromolecule type fuel cell which the aforementioned macromolecule ion-exchange component is a non-fluorine, and is an aromatic-hydrocarbon system macromolecule ion-exchange component meltable to a solvent is offered.

[0007] The aromatic-hydrocarbon system macromolecule ion-exchange component of the air pole which is outside when it floods with a solvent, and a fuel electrode dissolves the aforementioned collection object, and, thereby, recovery of a catalyst particle is performed. Then, if a non-melt is taken out from a solvent, since it is a portion equivalent to an electrolyte film, recovery of an electrolyte film will be performed. An electrolyte film can be obtained using this as a film molding material.

[0008]

[Embodiments of the Invention] In drawing 1 , the cell 1 which constitutes a solid-state macromolecule type fuel cell consists of diffusion layers 5 and 6 of the couple stuck to the electrolyte film 2, the air pole 3 and fuel electrode 4 which are stuck to the both sides, respectively, and these two poles 3 and 4, respectively, and separator 7 and 8 of the couple stuck to both- [these] the diffusion layers-5 and 6. In the example, the electrolyte film 2, an air pole 3, and not only the fuel electrode 4 but both the diffusion layers 5 and 6 are included in the electrolyte film-electrode collection object 9.

[0009] The electrolyte film 2 consists of aromatic-hydrocarbon system macromolecule ion-exchange components. An air pole 3 and a fuel electrode 4 consist of two or more catalyst particles which made the front face of a carbon black particle support two or more Pt particles, and the same as that of the above or a different aromatic-hydrocarbon system macromolecule ion-exchange component, respectively.

[0010] Hydrogen is supplied to two or more slots 11 on the relation which each diffusion layers 5 and 6 consist of a porous carbon paper, a carbon plate, etc., and each separator 7 and 8 consists of graphitized carbon so that it may have the same gestalt, air is in the separator 8 by the side of a fuel electrode 4 in two or more slots 10 which consist in the separator 7 by the side of an air pole 3 again, and intersect the aforementioned slot 10, respectively.

[0011] An aromatic-hydrocarbon system macromolecule ion-exchange component is a non-fluorine, and has in a solvent the property of being meltable. As this kind of a macromolecule ion-exchange component, the various ion exchangers mentioned to Table 1 are used.

[0012]

[Table 1]

高分子イオン交換成分	母 体	母体のベンゼン環のH原子との置換基
例 1	ポリエーテルエーテルケトン (PEEK)	スルホン酸基
例 2	ポリエーテルスルホン (PES)	
例 3	ポリスルホン (PSF)	
例 4	ポリエーテルイミド (PEI)	
例 5	ポリフェニレンスルフィド (PPS)	
例 6	ポリフェニレンオキシド (PPO)	

[0013] As a solvent, the various polar solvents mentioned to Table 2 are used.

[0014]

[Table 2]

極 性 溶 剤	沸 点
ジメチルアセトアミド (DMAc)	165.5℃
ジメチルホルムアミド (DMF)	153℃
ジメチルスルフォキシド (DMSO)	189℃
トリエチルフォスフェート (TEP)	115℃
N-メチルピロリドン (NMP)	202℃

[0015] The aromatic-hydrocarbon system macromolecule ion-exchange component which constitutes the electrolyte film 2, i.e., the 1st macromolecule ion-exchange component, (1st aromatic-hydrocarbon system macromolecule ion-exchange component) An air pole 3 And the solubility over the solvent of the aromatic-hydrocarbon system macromolecule ion-exchange component of a fuel electrode 4, i.e., the 2nd macromolecule ion-exchange component, (2nd aromatic-hydrocarbon system macromolecule ion-exchange component) It is desirable that the direction of the 2nd macromolecule ion-exchange component is size from the 1st macromolecule ion-exchange component. Since the 2nd macromolecule ion-exchange component of an air pole 3 and a fuel electrode 4 exists near the **** of the position which catalytic reaction produces, since thermal degradation is intense, the reason has it in collecting ahead of the electrolyte film 2 and discarding. It is possible for this to raise the purity of the 1st macromolecule ion-exchange component of the electrolyte film 2.

[0016] This soluble difference is attained by preparing a difference in the average molecular weight of both the macromolecules ion-exchange component, when the 1st and 2nd macromolecule ion-exchange component is the same or of the same kind. That is, it is easy

to dissolve rather than a thing with the high one where average molecular weight is lower. for example, the time of setting average molecular weight of the 1st macromolecule ion-exchange component to A in consideration of endurance a premise [the 1st and 2nd macromolecule ion-exchange component having 5000 or more average molecular weight], and setting average molecular weight of the 2nd macromolecule ion-exchange component to B -- the ratio of both average molecular weight -- as for B/A, it is desirable that it is $0.1 \leq B/A < 1.0$ however, a ratio -- if B/A is set to $B/A < 0.1$, the endurance of an air pole 3 and a fuel electrode 4 falls, and in order that those thickness maintenance ability may greatly decline, secular change, such as a power generation performance, will become remarkable On the other hand, the recovery of the 1st macromolecule ion-exchange component which constitutes the electrolyte film 2 from $B/A \geq 1.0$ falls.

[0017] It is also possible to use two sorts of things which differ in the solubility over a solvent as the 1st and 2nd macromolecule ion-exchange component, and have a different chemical composition.

[0018] Hereafter, an example is explained.

I. The manufacture carbon black particle (tradename : KETCHIEN black EC) of an electrolyte film-electrode collection object was made to support Pt particle, and the catalyst particle was prepared. The content of Pt particle in a catalyst particle is 50wt(s)%.

[Example-I] As an aromatic-hydrocarbon system macromolecule ion-exchange component, it is Example 1 (PEEK) of Table 1, and the 1st macromolecule ion-exchange component of 50,000 and average molecular weight prepared [average molecular weight] the 2nd macromolecule ion-exchange component of 45,000. in this case, the ratio of the average molecular weight A of the 1st macromolecule ion-exchange component, and the average molecular weight B of the 2nd macromolecule ion-exchange component -- B/A is $B/A = 0.9$

[0019] The electrolyte film 2 with a thickness of 50 micrometers was fabricated using the 1st macromolecule ion-exchange component. Moreover, the reflux dissolution of the 2nd macromolecule ion-exchange component was carried out at NMP of Table 2. The content of the 2nd macromolecule ion-exchange component in this solution is 6wt(s)%.

[0020] In the 2nd macromolecule ion-exchange component content solution, the catalyst particle was mixed so that it might be set to the 2nd macromolecule ion-exchange component:catalyst particle =3:5 by the weight ratio, subsequently in it, distribution of a catalyst particle was aimed at-using the ball mill, and the air pole 3 and the slurry for fuel electrodes 4 were prepared in it. The amount of Pt(s) is this slurrymg [0.5 //cm] 2 It applied to both sides of the electrolyte film 2, respectively so that it might become, and the diffusion layer 5 and the porosity carbon plate for six with which it was given a water-repellent finish at these application layer, respectively were applied after dryness, the hotpress was performed the condition for 140 degrees C, 1.5MPa, and 1 minute, and the electrolyte film-electrode collection object 9 was acquired. This is made into an example (1).

[Example-II] As an aromatic-hydrocarbon system macromolecule ion-exchange component, it is Example 1 (PEEK) of Table 1, and the 1st macromolecule ion-exchange component of 50,000 and average molecular weight prepared [average molecular weight] the 2nd macromolecule ion-exchange component of 45,000 for the example-I said appearance. in this case, the ratio of the average molecular weight A of the 1st macromolecule ion-exchange component, and the average molecular weight B of the 2nd macromolecule ion-exchange component -- B/A is $B/A = 0.9$

[0021] Henceforth, except for the point of having set the temperature of a hotpress as 200 degrees C, the same method as example-I was enforced and the electrolyte film-electrode collection object 9 was acquired. This is made into an example (2).

[Example-III] As an aromatic-hydrocarbon system macromolecule ion-exchange component, it is Example 2 (PES) of Table 1, and the 1st macromolecule ion-exchange component of 50,000 and average molecular weight prepared [average molecular weight] the 2nd macromolecule ion-exchange component of 45,000. in this case, the ratio of the average molecular weight A of the 1st macromolecule ion-exchange component, and the average molecular weight B of the 2nd macromolecule ion-exchange component -- B/A is $B/A = 0.9$

[0022] Henceforth, except for the point of having set the temperature of a hotpress as 190 degrees C, the same method as example-I was enforced and the electrolyte film-electrode

collection object 9 was acquired. This is made into an example (3).

[Example-IV] As an aromatic-hydrocarbon system macromolecule ion-exchange component, it is Example 3 (PSF) of Table 1, and the 1st macromolecule ion-exchange component of 50,000 and average molecular weight prepared [average molecular weight] the 2nd macromolecule ion-exchange component of 25,000. in this case, the ratio of the average molecular weight A of the 1st macromolecule ion-exchange component, and the average molecular weight B of the 2nd macromolecule ion-exchange component -- B/A is $B/A=0.5$ [0023] Henceforth, except for the point of having set the temperature of a hotpress as 170 degrees C, the same method as example-I was enforced and the electrolyte film-electrode collection object 9 was acquired. This is made into an example (4).

[Example-V] It is an example as an aromatic-hydrocarbon system macromolecule ion-exchange component. - Like IV, it is Example 3 (PSF) of Table 1, and the 1st macromolecule ion-exchange component of 50,000 and average molecular weight prepared [average molecular weight] the 2nd macromolecule ion-exchange component of 12,500. in this case, the ratio of the average molecular weight A of the 1st macromolecule ion-exchange component, and the average molecular weight B of the 2nd macromolecule ion-exchange component -- B/A is $B/A=0.25$

[0024] Henceforth, example - Like IV, except for the point of having set the temperature of a hotpress as 170 degrees C, the same method as example-I was enforced and the electrolyte film-electrode collection object 9 was acquired. This is made into an example (5).

[Example-VI] It is an example as an aromatic-hydrocarbon system macromolecule ion-exchange component. - Like IV, it is Example 1 (PEEK) of Table 1, and the 1st macromolecule ion-exchange component of 50,000 and average molecular weight prepared [average molecular weight] the 2nd macromolecule ion-exchange component of 5,000. in this case, the ratio of the average molecular weight A of the 1st macromolecule ion-exchange component, and the average molecular weight B of the 2nd macromolecule ion-exchange component -- B/A is $B/A=0.1$ Henceforth, example - Like IV, except for the point of having set the temperature of a hotpress as 170 degrees C, the same method as example-I was enforced and the electrolyte film-electrode collection object 9 was acquired. This is made into an example (6).

[Example-VII] As an aromatic-hydrocarbon system macromolecule ion-exchange component, it is Example 1 (PEEK) of Table 1, and the 1st macromolecule ion-exchange component of 50,000 and average molecular weight prepared [average molecular weight] the 2nd macromolecule ion-exchange component of 2,500 for the example-I said appearance. in this case, the ratio of the average molecular weight A of the 1st macromolecule ion-exchange component, and the average molecular weight B of the 2nd macromolecule ion-exchange component -- B/A is $B/A=0.05$

[0025] Henceforth, example - Like IV, except for the point of having set the temperature of a hotpress as 170 degrees C, the same method as example-I was enforced and the electrolyte film-electrode collection object 9 was acquired. Let this be an example of comparison (1).

[Example-VIII] As an aromatic-hydrocarbon system macromolecule ion-exchange component, it is Example 1 (PEEK) of Table 1, and the 1st macromolecule ion-exchange component of 50,000 and average molecular weight prepared [average molecular weight] the 2nd macromolecule ion-exchange component of 75,000 for the example-I said appearance. in this case, the ratio of the average molecular weight A of the 1st macromolecule ion-exchange component, and the average molecular weight B of the 2nd macromolecule ion-exchange component -- B/A is $B/A=1.5$

[0026] Henceforth, example - Like IV, except for the point of having set the temperature of a hotpress as 170 degrees C, the same method as example-I was enforced and the electrolyte film-electrode collection object 9 was acquired. Let this be an example of comparison (2).

Examples (1), such as recovery of the 1st macromolecule ion-exchange component which constitutes II. electrolyte film, were immersed in DMAc (boiling point : 165.5 degrees C) of Table 2, subsequently, the temperature up of the DMAc was carried out to 165 degrees C, and the 2nd macromolecule ion-exchange component which constitutes an air pole 3 and a fuel electrode 4 by this was dissolved. The electrolyte film 2 and diffusion layers 5 and 6 were taken out out of DMAc, pressure filtration processing was performed to the DMAc, and

the mixture of a catalyst particle and the 2nd macromolecule ion-exchange component was separated from DMAc. The mixture was burned and catalyst particles were collected.

[0027] On the other hand, the electrolyte film 2 was immersed in new DMAc, subsequently, the temperature up of the DMAc was carried out to 165 degrees C, and this dissolved completely the electrolyte film 2, therefore the 1st macromolecule ion-exchange component. It condensed until it held this solution in the temperature up state succeeding and the remainder became less than [50vol%]. The acetone was added to concentration liquid, the 1st macromolecule ion-exchange component was settled, subsequently it filtered, and the 1st macromolecule ion-exchange components were collected.

[0028] Example (2) About - (6) and the example of comparison (1), and (2), the same work as the above was done and the catalyst particle and the 1st macromolecule ion-exchange component in them were collected.

[0029] And recovery $F=(E/D) \times 100(\%)$ was computed by having set the weight of the 1st macromolecule-ion-exchange-component-of-the-beginning-to-D, and having set the weight of that after recovery to E.

[0030] Moreover, about example (1) - (6) and the example of comparison (1), and (2), the compression durability test was performed on 150 degrees C, 80% of temperature, planar pressure 0.8MPa, and the conditions of 200 hours, it asked for the thickness retention H of the electrolyte film 2, and the thickness retention J of an air pole 3 (a fuel electrode 4 is also good), and, subsequently ratio $K=(J/H) \times 100(\%)$ of both the thickness retention

[0031] the ratio of the average molecular weight A and B of the 1st concerning [Table 3] example (1) - (6) and the example of comparison (1), and (2), and 2nd macromolecule ion-exchange component -- the recovery F of B/A and the 1st macromolecule ion-exchange component and the ratio K of both the thickness retention H and J are shown

[0032]

[Table 3]

電解質膜－ 電極集成体	両平均分子量 の比 B/A	第1の高分子イ オン交換成分の 回収率F (%)	両厚さ保持率 の比率K (%)
実施例 (1)	0.9	90	98
実施例 (2)	0.9	90	98
実施例 (3)	0.9	90	98
実施例 (4)	0.5	92	94
実施例 (5)	0.25	92	92
実施例 (6)	0.1	92	88
比較例 (1)	0.05	91	64
比較例 (2)	1.5	52	100

[0033] drawing 2 -- Table 3 -- being based -- the ratio of both average molecular weight -- a relation with the ratio K of the recovery F of B/A and the 1st macromolecule ion-exchange component and both thickness retention is graph-ized

[0034] In example (1) - (6), the recovery F of the 1st macromolecule ion-exchange component and the ratio K of both thickness retention are high so that clearly from Table 3 and drawing 2 . while both the average molecular weight A and B of this is A and $B \geq 5000$ -- a ratio -- it originates in B/A being $0.1 \leq B/A < 1.0$

[0035] Since the average molecular weight B of the 2nd macromolecule ion-exchange

component is $B \leq 5000$, although the recovery F of the 1st macromolecule ion-exchange component of the example of comparison (1) is high, the compression endurance of an air pole 3 is low, therefore a ratio K falls. On the other hand, since the example of comparison (2) is $B/A \geq 1.0$, in order for the 1st macromolecule ion-exchange component to tend to dissolve it rather than the 2nd macromolecule ion-exchange component, the recovery F of the 1st macromolecule ion-exchange component falls sharply.

Correlation with the existence of an III. water repellent, and a power generation performance (1) The carbon black particle (tradename : KETCHIEN black EC) of the manufacture 1st of an example (7) was made to support Pt particle, and the catalyst particle for fuel electrodes 4 was prepared. The content of Pt particle in a catalyst particle is 50wt(s)%.

[0036] Moreover, the 2nd carbon black particle (tradename : Vulcan XC- 72) was made to support Pt particle, and the catalyst particle for air poles 3 was prepared. The content of Pt particle in this catalyst particle is 50wt(s)%.

[0037] As an aromatic-hydrocarbon system macromolecule ion-exchange component, it is Example 1 (PEEK) of Table 1, and the 1st macromolecule ion-exchange component of 50,000 and average molecular weight prepared [average molecular weight] the 2nd macromolecule ion-exchange component of 45,000. in this case, the ratio of the average molecular weight A of the 1st macromolecule ion-exchange component, and the average molecular weight B of the 2nd macromolecule ion-exchange component -- B/A is $B/A=0.9$ [0038] The electrolyte film 2 with a thickness of 50 micrometers was fabricated using the 1st macromolecule ion-exchange component. Moreover, the reflux dissolution of the 2nd macromolecule ion-exchange component was carried out at NMP of Table 2. The content of the 2nd macromolecule ion-exchange component in this solution is 6wt(s)%.

[0039] the 2nd macromolecule ion-exchange component content solution -- a weight ratio -- the object for the 2nd macromolecule ion-exchange component: fuel electrode 4 -- the catalyst particle was mixed, subsequently distribution of a catalyst particle was aimed at using the ball mill, and the slurry for fuel electrodes 4 was prepared so that it might be set to catalyst particle =3:5

[0040] moreover, the macromolecule ion-exchange component content solution of the above 2nd -- a weight ratio -- the object for the 2nd macromolecule ion-exchange component: air pole 3 -- the catalyst particle was mixed so that it might be set to catalyst particle =3:5, subsequently distribution of a catalyst particle was aimed at using the ball mill, and the slurry for air poles 3 was prepared The amount of Pt(s) is both slurries 0.5 mg/cm² It applied to both sides of the electrolyte film 2, respectively so that it might become, and after dryness, the diffusion layer 5 and the carbon paper for six were applied to these application layer, respectively, the hotpress was performed the condition for 140 degrees C, 1.5MPa, and 1 minute in it, and the electrolyte film-electrode collection object 9 was acquired in it. This is made into an example (7).

[0041] (2) As a water repellent, PTFE (polytetrafluoroethylene) was added to the slurry for air poles 3 stated by manufacture of the manufacture example (7) of the example of comparison (3), and the new slurry for air poles 3 was prepared to it. In this case, the addition L of PTFE was set to the 10wt(s)%, $L=0.1M$ [i.e.,], when the weight sum of the 2nd macromolecule ion-exchange component and the catalyst particle for air poles 3 was set to M .

[0042] Except for the point of having used the slurry for air poles 3 containing such PTFE, the same method as the case of an example (7) was enforced, and the electrolyte film-electrode collection object 9 was acquired. Let this be an example of comparison (3).

[0043] (3) It generated electricity by having assembled the solid-state macromolecule type fuel cell using the example (7), and the relation between current density and terminal voltage was measured. Moreover, it performed that the same was said of the example of comparison (3).

[0044] Table 4 shows a measurement result. Front Naka and a cell [a fruit (7)] mean the cell which used the example (7), and a cell [a ratio (3)] means the cell which used the example of comparison (3). This is henceforth the same. In addition, as for the water amount of adsorption in 60 degrees C, the KETCHIEN black EC was 370 cc/g and Vulcan XC-72 were 72 cc/g.

[0045]

[Table 4]

電流密度 (A/cm ²)	端 子 電 圧 (V)	
	電池 (実 (7))	電池 (比 (3))
0.0	0.95	0.96
0.1	0.82	0.83
0.2	0.77	0.78
0.3	0.72	0.72
0.4	0.7	0.7
0.5	0.67	0.68
0.6	0.65	0.66
0.7	0.62	0.64
0.8	0.58	0.59
0.9	0.54	0.55
1.0	0.5	0.51
1.1	0.46	0.48
1.2	0.42	0.43
1.3	0.38	0.38
1.4	0.33	0.33
1.5	0.24	0.24

[0046] Drawing 3 graph-izes relation between current density and terminal voltage based on Table 4. For the cell [a ratio (3)] using PTFE as a water repellent so that clearly from Table 4 and drawing 3, although the power generation performance is excellent a little compared with the cell [a fruit (7)] without PTFE, the difference is current density 1.0 A/cm². It is small as it said that the terminal voltage difference which can be set was 10mV.

[0047] an example (7) and the example of comparison (3) -- setting -- the recovery of the electrolyte film 2, therefore the 1st macromolecule ion-exchange component -- abbreviation - - although it is the same, in the case of the example of comparison (3), recovery of the catalyst particle from an air pole 3 is very difficult from PTFE being included

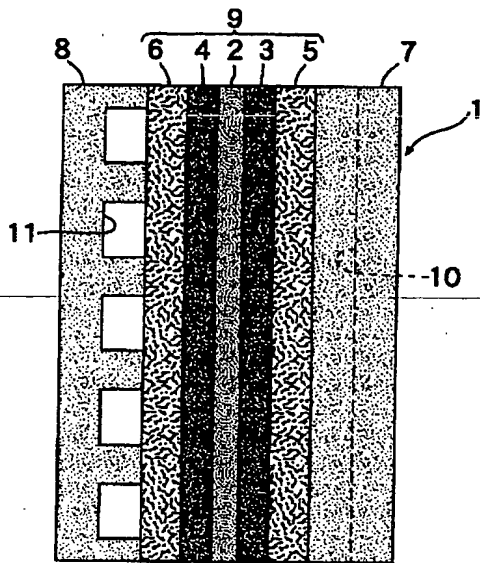
[0048]

[Effect of the Invention] According to invention according to claim 1, the electrolyte film-electrode collection object which can collect and reuse the catalyst particle contained in an air pole and a fuel electrode and the macromolecule ion-exchange component of an electrolyte film can be offered by constituting as mentioned above.

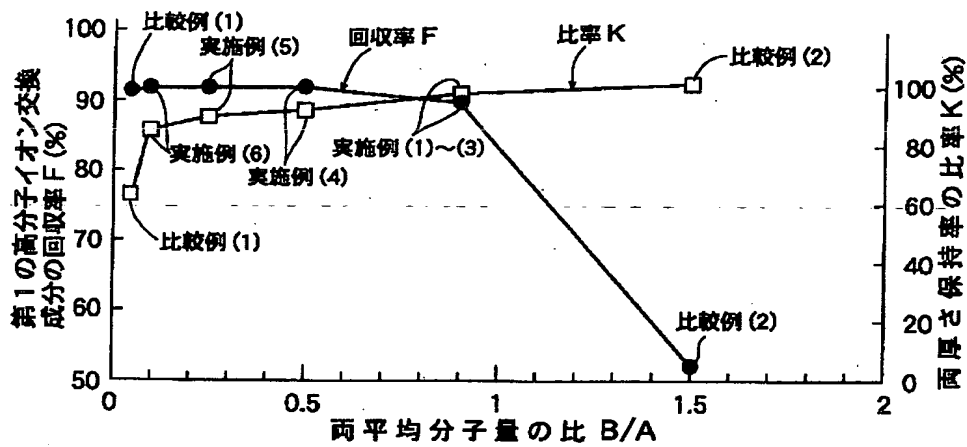
[0049] According to invention according to claim 2, the electrolyte film-electrode collection object which can raise the recovery of a catalyst particle and an electrolyte film further can be offered.

DRAWINGS

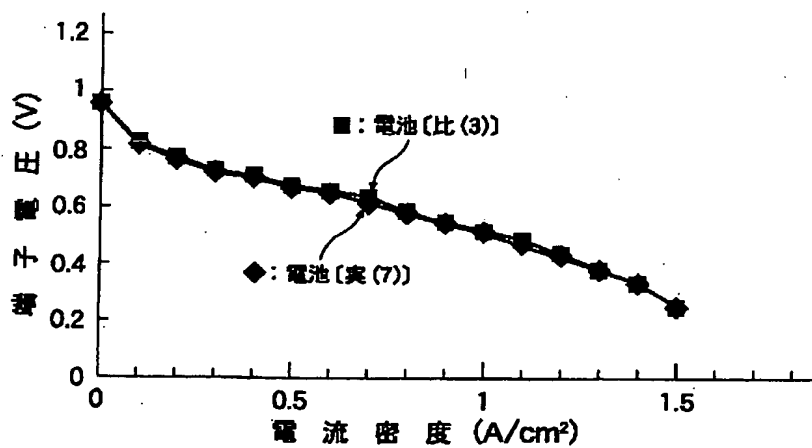
[Drawing 1]



[Drawing 2]



[Drawing 3]



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(54) **INTEGRATED ASSEMBLY OF ELECTROLYTE
FILM AND ELECTRODE FOR SOLID POLYMER
FUEL CELL**

(57) Abstract:

PROBLEM TO BE SOLVED: To provide an integrated assembly of an electrolyte film and an electrode for a solid polymer fuel cell which can maintain a high power-generating performance at a running temperature of 85°C or more.

SOLUTION: The integrated assembly of the electrolyte film and the electrode 9 is provided with an electrolyte film 2 and an air electrode and a fuel electrode 4 pinching the electrolyte film, each of which has a polymer ion exchange component. The electrolyte film/electrode integrated assembly 9 has an ion exchange capacity I_c of $0.9 \text{ meq/g} \leq I_c \leq 5 \text{ meq/g}$, and a dynamic viscoelasticity coefficient D_v of $5 \times 10^8 \text{ Pa} \leq D_v \leq 1 \times 10^{10} \text{ Pa}$ at 85°C.

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